

Claims:

1. Please cancel claims 1-17, without prejudice, and substitute therefor new Claims 18-33
(new), as follows:

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1 Claim 18 (new) An apparatus for measuring critical parameters used in manufacturing
2 of capital goods in microelectronic processing without evasive interruptions to manufacturing equipment,
3 the critical parameters selected from the group consisting of temperature, liquid and gas flow rate,
4 distance, particles, humidity, pressure, viscosity, radiation, velocity, density, acceleration, stress/strain,
5 pH, the critical parameters related to chemical/material analysis techniques selected from the group
6 consisting of Energy Dispersive x-ray Spectroscopy (EDS), Cathodoluminescence (CL), X-ray
7 Photoelectron Spectroscopy (XPS), Ultraviolet Photoelectron Spectroscopy (UPS), Auger, Electron
8 Spectroscopy (AES), Reflection High Energy Electron Diffraction (REELS), X-ray Fluorescence (XRF),
9 Photoluminescence (PL), Modulation Spectroscopy, Variable Angle Spectroscopic Ellipsometry (VASE),
10 Fourier Transform Infrared Spectroscopy (FTIR), Raman Spectroscopy, Solid State Nuclear Magnetic
11 Resonance (NMR), Rutherford Backscattering Spectroscopy (RBS), Elastic Recoil Spectroscopy (ERS),
12 Ion, Scattering Spectroscopy (ISS), Residual Gas Analyzer (RGA), Dynamic/Static Secondary Ion Mass
13 Spectroscopy, Laser Ionization Mass Spectroscopy (LIMS), Sputtered Neutral Mass Spectroscopy
14 (SNMS), Glow Discharge Mass Spectroscopy (GDMS), Inductively Coupled Plasma Mass Spectroscopy,
15 Inductively Coupled Plasma/Optical Emission Spectroscopy, Neutron Diffraction, Neutron Reflectivity,
16 Neutron Activation Analysis (NAA), Nuclear Reaction Analysis (NRA) and combinations thereof, the
17 apparatus comprising:

18 one or more sensors, the one or more sensors attached to surfaces on the capital goods for
19 collecting data therefrom;

20 an electronic device for processing data collected from the one or more sensors; and

21 an energy source for the electronic device, wherein said sensors and electronic device reside
22 completely on the surface of the capital goods.

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1 Claim 19 (new) The apparatus of Claim 18 (new) in which the electronic device comprises one
2 or more of the following: an analog to digital converter, a signal conditioning device and a data recording
3 device.

1 Claim 20 (new) The apparatus of claim 18 (new) further comprising an external wireless
2 receiving module wherein the collected data is transmitted digitally in real-time from the electronic device
3 to the external wireless receiving module, and wherein the data can be further utilized as desired.

1 Claim 21 (new) The apparatus of claim 18 (new) in which the electronic device further
2 comprises a solid state memory device wherein the collected data is stored locally on the solid state
3 memory device such that the data can later be downloaded and utilized.

1 Claim 22 (new) The apparatus of claim 21 (new) in which the solid state memory is selected
2 from the group consisting of Electrically Erasable Read Only Memory, (EEPROM), Ferroelectric Random
3 Access Memory (FeRAM), Magnetic Bubble Memory, Flash, Dynamic Random Access Memory, Static
4 Random Access Memory, First In / First Out (FIFO) and Giant MagnetoResistive Random Access
5 Memory (GMR RAM).

1 Claim 23 (new) The apparatus of claim 18 (new) in which the energy source comprises a
2 battery functional at elevated temperatures up to 150°C.

1 Claim 24 (new) The apparatus of claim 23 (new) wherein the battery is selected from the group
2 consisting of lithium metal, lithium ion, and Nickel Metal Hydride (NiMH) batteries.

1 Claim 25 (new) The apparatus of claim 18 (new) further comprising an isolation material to
2 protect the electronic device from hostile manufacturing or processing environments.

1 Claim 26 (new) The apparatus of claim 25 (new) in which the isolation material is selected
2 from the group consisting of material with low thermal conductivity, material with low emmisivity, and
3 material with low convectivity.

1 Claim 27 (new) The apparatus of claim 25 (new) in which the isolation material is selected
2 from the group consisting of silica aerogel, carbon aerogel, silica whiskers, vermiculite, stabilized
3 zirconia, clay, and combinations thereof.

1 Claim 28 (new) The apparatus of claim 25 (new) in which the isolation material is a material
2 with high resistance to chemical attack.

1 Claim 29 (new) The apparatus of claim 25 (new) in which the isolation material is a material
2 with low permeability.

1 Claim 30 (new) The apparatus of claim 18 (new) in which the one or more sensors, electrical
2 device and energy source operate in a vacuum.

1 Claim 31 (new) The apparatus of claim 18 (new) in which any one of the one or more sensors,
2 electrical device and energy source are hermetically sealed, such that the apparatus is particularly adapted
3 to operation in a vacuum environment.

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